

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FOREST SURVEY HANDBOOK

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This handbook provides subject-matter standards for the nationwide Forest Survey, sampling-accuracy standards, definitions of terms, and other operational guidelines. These are aimed at obtaining comprehensive and comparable information on timber resources for all parts of the country as a basis for appraisals of the timber situation in the various States and for the United States as a whole.

This handbook, along with Survey work plans and Regional supplements, should provide complete information on (1) inventory sampling design; (2) field inventory procedures; (3) methods for office compilation of data; (4) plans for obtaining estimates of timber cut, involving industrial or related surveys; (5) schedules of field and office work for each State or Survey unit in the Station territory and a schedule of planned Survey reports; (6) Survey organization and functions, including cooperative arrangements with other agencies; and (7) estimated cost of each phase of the Survey.

The definitions specified in section 01 of this handbook should be used in all Survey plans, handbooks, reports, and releases in order to ensure general understanding and use of Forest Survey concepts. Complete specifications for items in this handbook that are to be defined according to Regional standards should be included in supplements to this handbook.

Requests for exceptions to requirements specified in this handbook, along with a statement justifying the need for an exception, should be forwarded to the Washington Office for consideration.

Revisions of this handbook may be proposed to the Washington Office at any time. These must be made in terms of specific wording, additions, or deletions.

01 - Definition of Terms. Terms used in this handbook are defined below.

1. Acceptable Trees. Growing-stock trees of commercial species that meet specified standards of size and quality, but not qualifying as desirable trees.
2. Afforested Areas. Lands formerly not in tree cover, but converted to forests by planting.
3. Allowable Cut. The volume of timber that would be cut on commercial forest land during a given period under specified management plans aimed at sustained production of timber products.

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4. Area Condition Class. A classification of commercial forest land based upon stocking of desirable trees and other conditions affecting current and prospective timber growth.

5. Available Cut. The volume of timber that would be available for cutting on commercial forest land during a given period under specified assumptions concerning growth, cut, mortality, and forest management practices.

6. Bureau of Land Management Lands. Federal land administered by the Bureau of Land Management.

7. Clear Panel. A section of the tree surface one-fourth the circumference of the tree and at least 2 feet long free of limbs, knots, bumps and other indications of defect which preclude clear cuttings.

8. Commercial Forest Land. Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as commercial forest land have the capability of producing in excess of 20 cubic feet per acre per year of industrial wood under management. Currently inaccessible and inoperable areas are included, except when the areas involved are small and unlikely to become suitable for production of industrial wood in the foreseeable future.)

9. Commercial Species. Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality, such as hawthorn and sumac.)

10. Cull. Portions of a tree that are unusable for industrial wood products, because of rot, form, or other defect.

11. Crown Class. A classification of trees based on dominance in relation to adjacent trees in the stand as indicated by crown development and amount of light received from above and the sides. Crown classes recognized by the Forest Survey include:

a. Open Grown. Trees with crowns which have received full light from above and from all sides throughout all or most of the life of the trees, particularly during early development.

b. Dominant Trees. Trees with well-developed crowns extending above the general level of the crown cover and receiving full light from above and part light from the sides.

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c. Codominant Trees. Trees with crowns forming the general level of the crown cover and receiving full light from above, but comparatively little from the sides; usually with medium-sized crowns more or less crowded on the sides.

d. Intermediate Trees. Trees with crowns either below or extending into the crown cover formed by codominant and dominant trees, receiving little direct light from above, and none from the sides; usually with small crowns considerably crowded on the sides.

e. Overtopped Trees. Trees with crowns entirely below the general level of the crown cover, receiving no direct light either from above or from the sides.

12. Desirable Trees. Growing-stock trees of commercial species (a) having no serious defects in quality limiting present or prospective use for timber products, (b) of relatively high vigor, and (c) containing no pathogens that may result in death or serious deterioration before rotation age. (Note: These are the types of trees forest managers try to grow; that is, the trees favored in cultural operations. In over-rotation-age stands, desirable trees are low-risk trees.)

13. Diameter Classes. A classification of trees based on diameter outside bark, measured at breast height (4-1/2 feet above the ground). (Note: D.b.h. is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate mid-point for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.)

14. Face. A section of the tree surface one-fourth the circumference of the tree extending the full length of the log.

15. Farm. Either a place operated as a unit of 10 or more acres from which the sale of agricultural products totals \$50 or more annually or a place operated as a unit of less than 10 acres from which the sale of agricultural products for a year amounts to at least \$250. Places having less than the \$50 or \$250 minimum estimated sales in a given year are also counted as farms if they can normally be expected to produce products in sufficient quantity to meet the requirement of the definition.

16. Farm Operator. A person who operates a farm, either doing the work himself or directly supervising the work.

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17. Farmer-Owned Lands. Lands owned by farm operators.
(Note: These exclude land leased by farm operators from nonfarm owners, such as railroad companies and States.)

18. Farmer-Owned Leased. Lands owned by farm operators, but leased to forest industry.

19. Forest Industry Lands. Lands owned by companies or individuals operating wood-using plants.

20. Forest Land. Land at least *-16.7-* percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparison of basal area and/or number of trees, by age or size and spacing with specified standards. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelter-belt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet in width.) Also see definitions for land area, commercial forest land, noncommercial forest land, productive-reserved forest land, stocking, unproductive forest land, and water.

21. Forest Trees. Woody plants having a well-developed stem and usually more than 12 feet in height at maturity.

22. Forest Types. A classification of forest land based upon the species forming a plurality of live-tree stocking. (Note: Types shall be determined on the basis of species plurality of all live trees that contribute to stocking; that is, up to a maximum of 16 percent at each plot point.)

23. Gross Growth. Annual increase in net volume of trees in the absence of cutting and mortality.

24. Growing-Stock Trees. Live trees of commercial species qualifying as desirable or acceptable trees. (Note: Excludes rough, rotten, and dead trees.)

25. Growing-Stock Volume. Net volume in cubic feet of growing stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

26. Growth. (See definitions for net growth, gross growth, and ingrowth.)

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27. Hardwoods. Dicotyledonous trees, usually broad-leaved and deciduous.
28. Idle Farmland. Includes former croplands, orchards, improved pastures and farm sites not tended within the past 2 years and presently less than *-16.7-* percent stocked with trees.
29. Improved Pasture. Land currently improved for grazing by cultivation, seeding, irrigation, or clearing of trees or brush.
30. Indian Lands. Tribal lands held in fee by the Federal Government, but administered for Indian tribal groups, and Indian trust allotments.
31. Industrial Wood. All roundwood products, except fuelwood.
32. Ingrowth. The number or net volume of trees that grow large enough during a specified year to qualify as saplings, pole-timber, or sawtimber.
33. Land Area
- a. Bureau of the Census. The area of dry land and land temporarily or partly covered by water, such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.
 - b. Forest Survey. The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.
34. Limb. That part of the tree above the stump which does not meet the requirement for saw logs and upper-stem portions, including all live, sound branches to a minimum of 4 inches d.o.b.
35. Log Grades. A classification of logs based on external characteristics as indicators of quality or value.
36. Logging Residues. The unused portions of trees cut or killed by logging.
37. Miscellaneous Federal Lands. Federal lands other than National Forests, lands administered by the Bureau of Land Management, and Indian lands.

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38. Miscellaneous Private Lands. Privately owned lands other than forest-industry and farmer-owned lands.

39. Mortality. Number or sound-wood volume of live trees dying from natural causes during a specified period.

40. National Forest Land. Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

41. Net Annual Growth. The increase in volume of a specified size class for a specific year. (Note: Components of net annual growth include the increment in net volume of trees at the beginning of the specific year surviving to its end plus volume of trees reaching the size class during the year minus the volume of trees that died during the year minus the net volume of trees that became rough or rotten trees during the year.)

42. Net Volume. Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

43. Noncommercial Forest Land. (1) Unproductive forest land incapable of yielding crops of industrial wood, because of adverse site conditions and (2) productive-reserved forest land.

44. Noncommercial Species. Tree species of typically small size, poor form, or inferior quality which normally do not develop into trees suitable for industrial wood products.

45. Nonforest Land. Land that has never supported forests and lands formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1-to-40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide, and clearings, etc., more than 1 acre in size, to qualify as nonforest land.)

46. Nonstockable. Areas of forest land not capable of supporting seedlings of commercial species, because of the presence of rock, water, etc.

47. Nonstocked Land. Commercial forest land less than 16.7 percent stocked with growing-stock trees.

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48. Old-Growth Sawtimber Stands. Sawtimber stands in which 50 percent or more of the area is occupied by old-growth sawtimber trees.

49. Old-Growth Sawtimber Trees. Trees that are at least 100 years old.

50. Other Federal Lands. Federal lands other than National Forests, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

51. Other Removals. The net volume of growing-stock trees removed from the inventory by cultural operations, such as timber-stand improvements, land clearing, and changes in land use.

52. Overgrown Knot. The scar left in the bark by a limb completely overgrown, but still outlined by the circular configuration in the bark.

53. Overstocked Areas. Areas where growth of trees is significantly reduced by excessive numbers of trees. (Note: Stands will be considered overstocked if stocking is 133 percent or more, when 100 percent represents the minimum level of stocking required to make full use of the site.)

54. Ownership. Property owned by one owner, regardless of the number of parcels in a specified area.

55. Plant Byproducts. Wood products, such as pulp chips, obtained incidental to production of other manufactured products.

56. Plant Residues. Wood materials from manufacturing plants not utilized for some product. (Note: Includes slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings.)

57. Poletimber Stands. (See stand-size class.)

58. Poletimber Trees. Growing-stock trees of commercial species at least 5.0 inches in d.b.h., but smaller than sawtimber size.

59. Productive-Reserved Forest Land. Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas-tree production.

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60. Quality Classes. A classification of sawtimber volumes by log or tree grades.

61. Rangeland. Land on which the natural plant cover is composed principally of native grasses, forbs, or shrubs valuable for forage.

62. Rotation. The period of years between establishment of a stand of timber and the time when it is considered ready for cutting and regeneration.

63. Rotten Trees. Live trees of commercial species that do not contain at least one 12-foot saw log *-or two noncontiguous saw logs, each 8 feet or longer, -* now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

64. Rough Trees. (1) Live trees of commercial species that do not contain at least one 12-foot saw log *-or two noncontiguous saw logs, each 8 feet or longer, -* now or prospectively, and/or do not meet Regional specifications for freedom from defect primarily because of roughness or poor form, and (2) all live trees of non-commercial species.

65. Roundwood Products. Logs, bolts, or other round sections cut from trees for industrial or consumer uses. (Note: Include saw logs; veneer logs and bolts; cooperage logs and bolts; pulpwood; fuelwood; piling; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

66. Salvable Dead Trees. Standing or down dead trees that are considered merchantable by Regional standards.

67. Saplings. Live trees 1.0 inch to 5.0 inches in diameter at breast height.

68. Sapling-Seedling Stands. (See stand-size class.)

69. Saw Log. A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter inside bark for softwoods of 6 inches (8 inches for hardwoods) or other combinations of size and defect specified by Regional standards.

70. Saw Log Portion. That part of the bole of sawtimber trees between the stump and the saw log top.

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71. Saw Log Top. The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

72. Sawtimber Stands. (See stand-size class.)

73. Sawtimber Trees. Live trees of commercial species containing at least a 12-foot saw log and meeting Regional specifications for freedom from defect. Softwoods must be at least 9.0 inches in diameter breast height, except in California, Oregon, Washington, and coastal Alaska where the minimum diameter is 11.0 inches. Hardwoods must be at least 11.0 inches in diameter in all States.

74. Sawtimber Volume. Net volume of the saw log portion of live sawtimber in board feet International 1/4-inch rule.

75. Seedlings. Live trees less than 1.0 inch in diameter at breast height that are expected to survive according to Regional standards.

76. Site Classes. A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

77. Softwoods. Coniferous trees, usually evergreen having needles or scalelike leaves.

78. Sound Knot or Limb. Knots or limbs intergrown or encased with the surrounding wood and with no indication of decay. Bark may or may not be present on the limbs.

79. Stand-Size Class. A classification of forest land based on the size class of growing stock trees on the area; that is, sawtimber, poletimber, or seedlings and saplings. (Note: Only those trees that contribute to no more than 16 percent stocking at a plot point will be considered in determining stand-size class.)

a. Sawtimber Stands. Stands at least *-16.7-* percent stocked with growing stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. Poletimber Stands. Stands at least *-16.7-* percent stocked with growing stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

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c. Sapling-Seedling Stands. Stands at least *-16.7-* percent stocked with growing stock trees of which more than half of the stocking is saplings and/or seedlings.

80. State, County, and Municipal Lands. Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

81. Stocking. The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard. (Note: Also see stocking explanation in section 21.5.)

82. Timber Removals. The net volume of growing stock trees removed from the inventory by harvesting; cultural operations, such as timber-stand improvement; land clearing; or changes in land use.

83. Timber Products. Roundwood products and plant byproducts. (Note: Timber products output includes roundwood products cut from growing stock on commercial forest land; from other sources, such as cull trees, salvable dead trees, limbs, and saplings; from trees on noncommercial and nonforest lands, and from plant byproducts.)

84. Tree Size Class. A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings and seedlings.

85. Unproductive Forest Land. Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions. (Note: Adverse conditions include sterile soils, dry climate, poor drainage, high elevation, steepness, and rockiness.)

86. Upper Stem Portion. That part of the bole of sawtimber trees above the saw log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

87. Urban and Other Areas. Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; schoolyards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

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88. Water

a. Bureau of the Census. Streams, sloughs, estuaries, and canals more than $1/8$ of a statute mile in width; and lakes, reservoirs, and ponds more than 40 acres in area.

b. Forest Survey. The same as the Bureau of the Census, except minimum width of streams, etc. is 120 feet and minimum size of lakes, etc. is 1 acre.

89. Young-Growth Sawtimber Stands. Sawtimber stands in which 50 percent or more of the stand is occupied by young-growth sawtimber trees.

90. Young-Growth Sawtimber Trees. Sawtimber trees less than 100 years old.